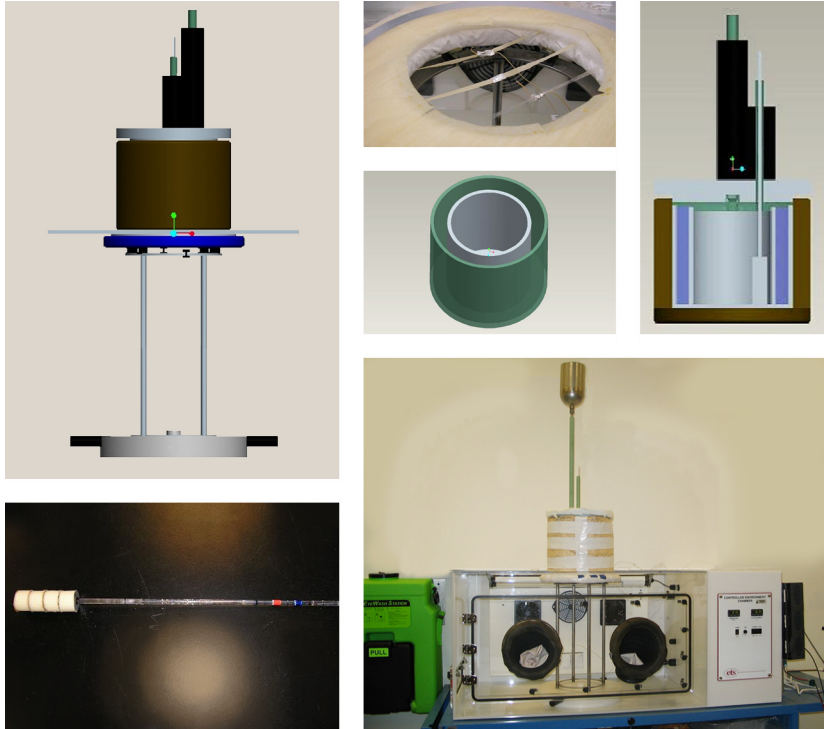




John F. Kennedy Space Center's Cryogenic Moisture Apparatus



The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of the Cryogenic Moisture Apparatus (CMA). Until the completion of the recent NASA Research Project on foams using the new CMA, very little information was available on the moisture intrusion into the spray-on foam insulation on the External Tank under substantial temperature gradients.

The CMA was developed by engineers in NASA Kennedy Space Center's Cryogenics Test Laboratory. The CMA addresses a need for physical characterization of materials under actual cryogenic use conditions. Engineers can obtain repeatable data on the moisture (water/ice) uptake into materials such as the foam insulation on the External Tank. This data is currently being used to understand Shuttle flight performance and to help guide design decisions for the Constellation flight vehicles.

BENEFITS

- Can be developed into a world-standard test protocol
- Can be adapted for a wide range of different materials, dimensions, and environmental conditions
- Testing is performed under actual-use conditions
- Able to obtain repeatable data on the moisture uptake into materials

opportunity

APPLICATIONS

The CMA can be used for statistical quality-control testing, as well as product development testing for refrigerated transportation and storage of

- Food
- Medicine
- Other Perishables

TECHNOLOGY STATUS

- ☒ Patent pending
- ☐ U.S. patent
- ☐ Copyrighted
- ☒ Available to license
- ☐ Available for no-cost transfer
- ☐ Seeking industry partner for further codevelopment

The CMA and method are also generic enough to be developed into a world-standard test protocol. Current test methods do not address the testing under actual-use conditions (that is, the full temperature difference across the thickness of the test specimen). The actual-use condition makes a monumental difference in the result because it is primarily this full delta-temperature that drives the uptake of the moisture into the material.

Technology Details

The Cryogenic Moisture Apparatus (CMA) is designed to determine the amount of water or ice taken into the specimen under actual-use cryogenic conditions. To simulate actual-use conditions, the top of the specimen is fixed at the temperature at which nitrogen is in a liquid state, while the bottom (outside) face is exposed to moist air at a constant humidity (90 percent) inside an environmental chamber. To keep the air quiet and the convection currents minimized, fans are not used. The surface temperatures of the specimen are also monitored by thermocouples and recorded by a data acquisition system. The edges of the CMA are guarded from moisture intrusion and from substantial heat leakage. The moisture uptake is measured by the water or ice taken into the specimen vertically (i.e., through the thickness of the specimen). In-house standard protocols are followed in accordance with Cryogenics Test Laboratory procedures.

Partnership Opportunities

NASA has applied for a U.S. patent on the the Cryogenic Moisture Apparatus and is seeking licensees of the patent. NASA has the authority to grant licenses on its domestic and foreign patents and patent applications pursuant to 35 U.S.C. 207-209. NASA has implemented this authority by means of the NASA Patent Licensing Regulations, 37 CFR § 404. All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA patent licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in the new Cryogenic Moisture Apparatus technology, or if you desire additional information, please reference Case Number KSC-13049 and contact:

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